2019 ADVANCED DUI TRIAL ADVOCACY

September 9 - 12, 2019
Phoenix, Arizona

CRASH RECONSTRUCTION

Presented by:

Aaron Harder
Vehicular Crimes Bureau Chief
Maricopa County Attorney's Office
&
Detective Ken Strohmeyer
Vehicle Crimes and Reconstruction, Traffic Enforcement Section
Scottsdale Police Department

Distributed by:

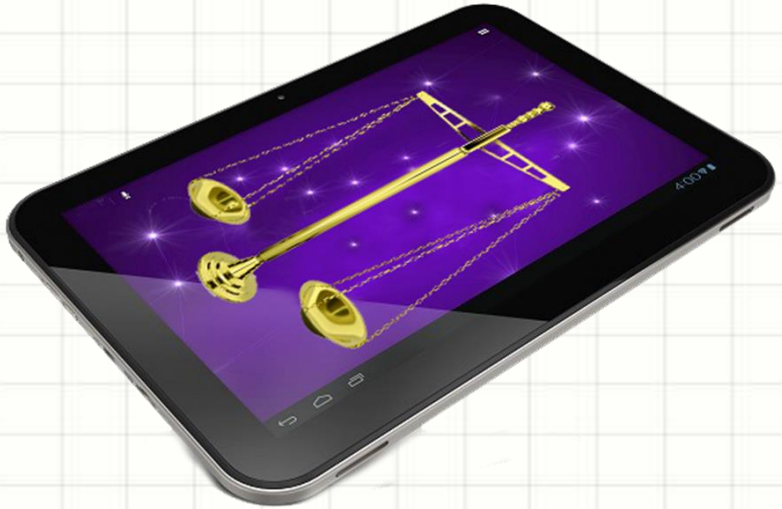
ARIZONA PROSECUTING ATTORNEYS' ADVISORY COUNCIL
1951 West Camelback Road, Suite 202
Phoenix, Arizona 85015

ELIZABETH BURTON ORTIZ
EXECUTIVE DIRECTOR

Presenting Collision Reconstruction in the Courtroom

Ken Strohmeyer
Scottsdale Police Department Vehicular Crimes Unit

Aaron Harder
Maricopa County Attorney's Office Vehicular Crimes Bureau



Scene and Evidence Collection

There are numerous aspects to scene investigation which entail a law enforcement perspective and a prosecution perspective.

Scene and Evidence Collection

Participating at the crime scene provides the prosecutor an avenue for to experience first hand what occurred and possibly provide prosecution insight to assist law enforcement.

Scene and Evidence Collection

Prosecutors will have a different outlook of the scene than law enforcement and can make note of the potential issues and strengths for trial.

Scene and Evidence Collection

Trial presentation begins at the scene. The scene walk through provides the roadmap for the trial presentation.

Traditional Evidence Collection Methods

The standard evidence measurement tools in the past, today and well into the future. Technology will not replace these items; however, it can improve upon the foundation that has been established. Accuracy and precision has improved with technology.

Electronic Evidence Collection Methods

The use of survey equipment for crime scene measurements has been used over the past three decades. This equipment has increased accuracy of measurements.

Electronic Evidence Collection Methods

3D Scanning.

Electronic Evidence Collection Methods

Drones

Electronic Evidence Collection Methods

Drones provide the ability to have photos of the surrounding areas

Comparison Of Aerial Diagrams

GIS/Google Earth Type Diagram

Drone Aerial Photograph Diagram


YOU CAN'T SEE ALL THE EVIDENCE (FACTS), AND I'LL TELL YOU WHAT THE LAW IS ALL ABOUT!
WHY DOES HE NEED US?
WHERE'S MY RUBBER STAMP?

Collision Reconstruction is based on …

Newton's First Law of Motion

A body at rest remains at rest, a body in motion remains in motion unless acted upon by an unbalanced external force

Collision Reconstruction is based on …

Newton's Second Law of Motion

If acted upon by an outside force, the center of mass of the body will accelerate in the direction of the force. The acceleration of the center of mass is directly proportional of the force acting upon it and inversely proportional to its mass.

Collision Reconstruction is based on …

Newton's Third Law of Motion

For every action there is an equal and opposite reaction. The opposing forces are equal in magnitude and opposite in direction.

Terms

Area of Impact

The place on the road or ground closest to the first contact between the colliding objects; impact/collision suggests a series of events which usually involve motion in an area over a period of time.

Terms

Gouge Marks

A pavement scar deep enough to be easily felt with the fingers.

Scrape Marks

A broad area of a hard surface covered with many scratches or striations made by a sliding metal part without great pressure.

Gouge Marks

Terms

Skid Mark

A friction mark on a pavement made by a tire that is sliding without rotation.

Scuff Mark

A tire friction mark made by a tire that is both rotating and slipping on a road or other surface; can also be called a yaw mark.

Skid and Scuff Marks

Skid Mark

Scuff Mark

Terms

Contact Damage

The deformation or defacement resulting from direct pressure or another object or surface in an impact; direct damage.

Induced Damage

The damage to a vehicle other than contact damage; often indicated by crumpling, distortion, bending, and breaking.

Contact and Induced Damage

Contact Damage

Induced Damage

Terms

Coefficient of Friction

A number representing the resistance to sliding of two surfaces in contact with each other.

Terms

Drag Factor

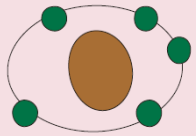
A percentage of what a vehicle can achieve based upon the tested coefficient of friction of the surface.

Vericom 4000DAQ

The Vericom 4000 DAQ is the newest product produced by Vericom Computers.

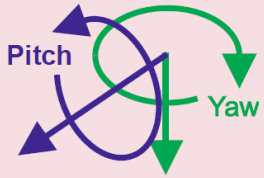
It is an instrument used to measure road friction and vehicle performance

Vericom 4000DAQ

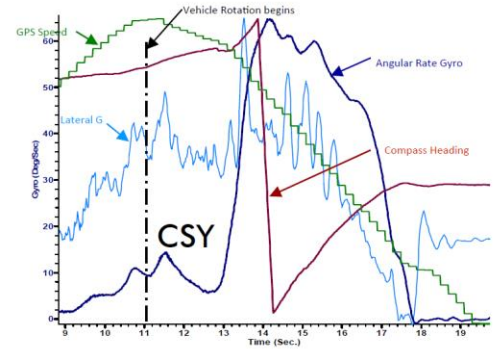


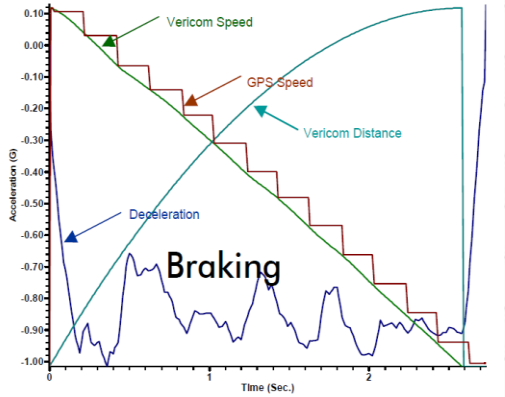
10Hz GPS
Built-in

PC Communications by
⇒ USB port.
⇒ Bluetooth up to 100 mete
⇒ SD card & 3ea RS232 port
⇒ Streaming data.



Internal 2 axis angular rate gyro for measuring yaw and automatic pitch adjustment





The development and use of the Vericom has spanned over 25 years. Accuracy while calculating speed and distance from acceleration and time. Its accuracy has been accepted in court. The 4000DAQ offers Run Duration Protocol and will plug into the vehicles power control module to further calculate with more accuracy. GPS Link adds another check to aid in the roadway friction calculations.

Vericom 4000DAQ

Header | Data | VC4000 Settings | Quick Graph | Map

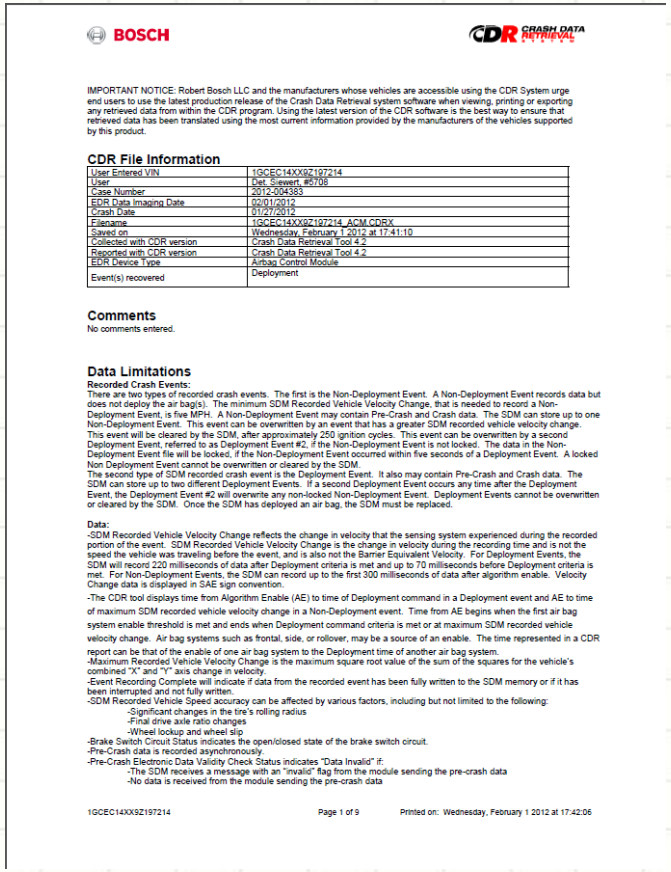
Time	Accelerati	Speed	Dist	GPS Spee	GPS Dist	GPS D-La	GPS D-Lo	GPS Lat	GPS Long	Gyro-Pitcl	Gyro-Pitcl
Secs	G	MPH	ft.	MPH	ft	ft	ft	deg	deg	deg/sec	deg
0.000	0.000	32.77	0.00	33.95	0.00	0	0	33.38562	111.86880	0.0	0.0
0.010	-0.268	32.71	0.48	33.95	0.50	0	0	33.38562	111.86880	-2.6	0.0
0.020	-0.364	32.63	0.96	33.77	0.99	0	0	33.38562	111.86880	-3.9	-0.1

GPS Link adds another check to aid in the roadway friction calculations.

Airbag Control Modules

If the vehicle is equipped with an airbag control module data may be obtained to assist with the reconstruction.

Airbag Control Modules



BOSCH

CDR CRASH DATA RETRIEVAL

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

CDR File Information

User Entered VIN	1GCEC14XX9Z197214
User	Det. Siewert, #5708
Case Number	2012-004383
EDR Data Imaging Date	02/01/2012
Crash Date	01/27/2012
Filename	1GCEC14XX9Z197214_ACM.CDRX
Saved on	Wednesday, February 1 2012 at 17:41:10
Collected with CDR version	Crash Data Retrieval Tool 4.2
Reported with CDR version	Crash Data Retrieval Tool 4.2
EDR Device Type	Airbag Control Module
Event(s) recovered	Deployment

Comments

No comments entered.

Data Limitations

Recorded Crash Events:

There are two types of recorded crash events. The first is the Non-Deployment Event. A Non-Deployment Event records data but does not deploy the air bag(s). The minimum SDM Recorded Vehicle Velocity Change, that is needed to record a Non-Deployment Event, is five MPH. A Non-Deployment Event may contain Pre-Crash and Crash data. The SDM can store up to one Non-Deployment Event. This event can be overwritten by an event that has a greater SDM recorded vehicle velocity change. This event will be cleared by the SDM, after approximately 250 ignition cycles. This event can be overwritten by a second Deployment Event, referred to as Deployment Event #2, if the Non-Deployment Event is not locked. The data in the Non-Deployment Event file will be locked, if the Non-Deployment Event occurred within five seconds of a Deployment Event. A locked Non Deployment Event cannot be overwritten or cleared by the SDM.

The second type of SDM recorded crash event is the Deployment Event. It also may contain Pre-Crash and Crash data. The SDM can store up to two different Deployment Events. If a second Deployment Event occurs any time after the Deployment Event, the Deployment Event #2 will overwrite any non-locked Non-Deployment Event. Deployment Events cannot be overwritten or cleared by the SDM. Once the SDM has deployed an air bag, the SDM must be replaced.

Data:

-SDM Recorded Vehicle Velocity Change reflects the change in velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event, and is also not the Barrier Equivalent Velocity. For Deployment Events, the SDM will record 220 milliseconds of data after Deployment criteria is met and up to 70 milliseconds before Deployment criteria is met. For Non-Deployment Events, the SDM can record up to the first 300 milliseconds of data after algorithm enable. Velocity Change data is displayed in SAE sign convention.

-The CDR tool displays time from Algorithm Enable (AE) to time of Deployment command in a Deployment event and AE to time of maximum SDM recorded vehicle velocity change in a Non-Deployment event. Time from AE begins when the first air bag system enable threshold is met and ends when Deployment command criteria is met or at maximum SDM recorded vehicle velocity change. Air bag systems such as frontal, side, or rollover, may be a source of an enable. The time represented in a CDR report can be that of the enable of one air bag system to the Deployment time of another air bag system.

-Maximum Recorded Vehicle Velocity Change is the maximum square root value of the sum of the squares for the vehicle's combined "X" and "Y" axis change in velocity.

-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.

-SDM Recorded Vehicle Speed accuracy can be affected by various factors, including but not limited to the following:

- -Significant changes in the tire's rolling radius
- -Final drive axle ratio changes
- -Wheel lockup and wheel slip

-Brake Switch Circuit Status indicates the open/closed state of the brake switch circuit.

-Pre-Crash data is recorded asynchronously.

-Pre-Crash Electronic Data Validity Check Status indicates "Data Invalid" if:

- -The SDM receives a message with an "invalid" flag from the module sending the pre-crash data
- -No data is received from the module sending the pre-crash data

1GCEC14XX9Z197214 Page 1 of 9 Printed on: Wednesday, February 1 2012 at 17:42:06

Multiple Event Data

Associated Events Not Recorded	0
Event(s) was an Extended Concatenated Event	No
An Event(s) was in Between the Recorded Event(s)	No
An Event(s) Followed the Recorded Event(s)	No
The Event(s) Not Recorded was a Deployment Event(s)	No
The Event(s) Not Recorded was a Non-Deployment Event(s)	No

System Status At AE

Low Tire Pressure Warning Lamp (If Equipped)	OFF
Vehicle Power Mode Status	Run
Remote Start Status (If Equipped)	Inactive
Run/Crank Ignition Switch Logic Level	Active

Pre-crash data

Parameter	-1.0 sec	-0.5 sec
Reduced Engine Power Mode	OFF	OFF
Cruise Control Active (If Equipped)	No	No
Cruise Control Resume Switch Active (If Equipped)	No	No
Cruise Control Set Switch Active (If Equipped)	No	No
Engine Torque (foot pounds)	-.74	-2.21

Pre-Crash Data

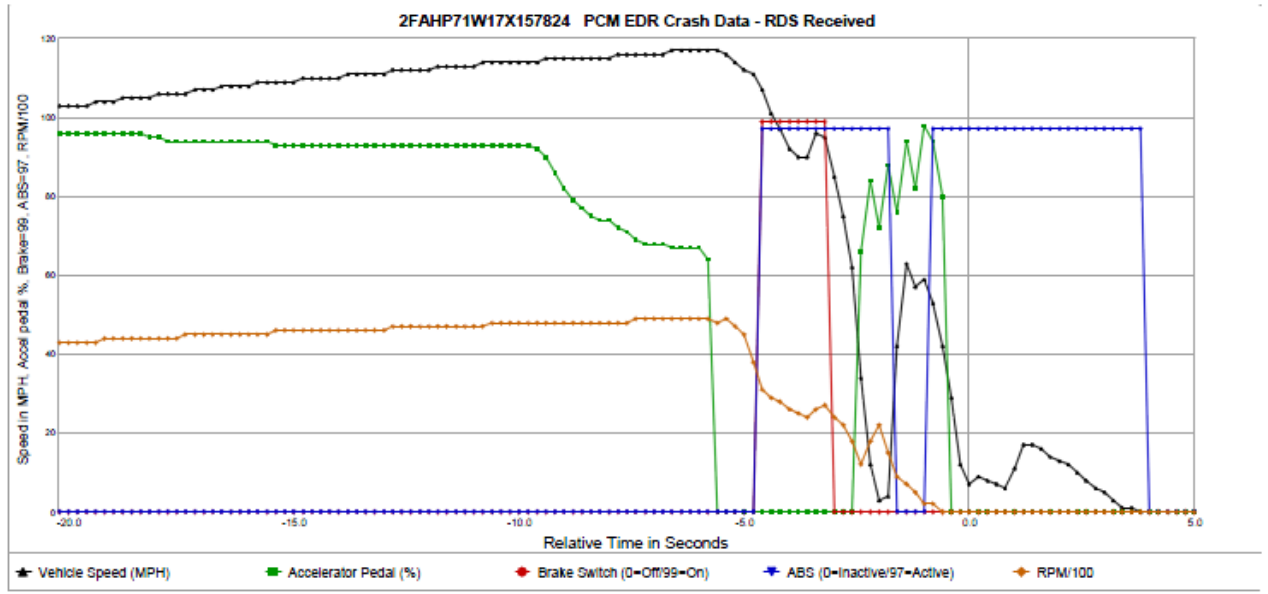
Parameter	-2.5 sec	-2.0 sec	-1.5 sec	-1.0 sec	-0.5 sec
Accelerator Pedal Position (percent)	14	14	0	0	0
Vehicle Speed (MPH)	62	62	62	62	60
Engine Speed (RPM)	1600	1600	1536	1536	1344
Percent Throttle	33	33	20	18	18
Brake Switch Circuit State	OFF	OFF	OFF	OFF	ON

Crash data retrieval reports provide a secondary check to the reconstructionist about methods used and accurate speed determination.

Airbag Control Modules

BOSCH

CDR CRASH DATA RETRIEVAL



BOSCH

CDR CRASH DATA RETRIEVAL

PCM EDR Data (1)

Buffer Address (Hex)	Relative Time (calc.) (Seconds)	Restraint Deployment Signal (Received / Not Received)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal % Full (%)	Engine Throttle % Full (%)	Brake Switch (On / Off)	Brake SC De-ac (On / Off)	ABS (Active / Inactive)	Transmission - Neutral (Neutral / Not Neutral)
EA000040	-20.2	Not Received	103 [166]	96.5	99	OFF	OFF	Not Active	Not Neutral
EA000050	-20.0	Not Received	103 [166]	96.5	99	OFF	OFF	Not Active	Not Neutral
EA000060	-19.8	Not Received	103 [166]	96.5	99	OFF	OFF	Not Active	Not Neutral
EA000070	-19.6	Not Received	103 [166]	96.5	99	OFF	OFF	Not Active	Not Neutral
EA000080	-19.4	Not Received	104 [167]	96.5	99	OFF	OFF	Not Active	Not Neutral
EA000090	-19.2	Not Received	104 [167]	96.5	99	OFF	OFF	Not Active	Not Neutral
EA0000A0	-19.0	Not Received	104 [167]	96.5	99	OFF	OFF	Not Active	Not Neutral
EA0000B0	-18.8	Not Received	105 [169]	96	99	OFF	OFF	Not Active	Not Neutral
EA0000C0	-18.6	Not Received	105 [169]	95.5	99	OFF	OFF	Not Active	Not Neutral
EA0000D0	-18.4	Not Received	105 [169]	95.5	99	OFF	OFF	Not Active	Not Neutral
EA0000E0	-18.2	Not Received	105 [169]	95	99	OFF	OFF	Not Active	Not Neutral
EA0000F0	-18.0	Not Received	106 [171]	95	99	OFF	OFF	Not Active	Not Neutral
EA000100	-17.8	Not Received	106 [171]	94.5	99	OFF	OFF	Not Active	Not Neutral
EA000110	-17.6	Not Received	106 [171]	94.5	99	OFF	OFF	Not Active	Not Neutral
EA000120	-17.4	Not Received	106 [171]	94.5	99	OFF	OFF	Not Active	Not Neutral
EA000130	-17.2	Not Received	107 [172]	94.5	99	OFF	OFF	Not Active	Not Neutral
EA000140	-17.0	Not Received	107 [172]	94.5	99	OFF	OFF	Not Active	Not Neutral
EA000150	-16.8	Not Received	107 [172]	94.5	99	OFF	OFF	Not Active	Not Neutral
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EA000170	-16.4	Not Received	108 [174]	94.5	99	OFF	OFF	Not Active	Not Neutral
EA000180	-16.2	Not Received	108 [174]	94	99	OFF	OFF	Not Active	Not Neutral
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EA0001C0	-15.4	Not Received	109 [175]	93	99	OFF	OFF	Not Active	Not Neutral
EA0001D0	-15.2	Not Received	109 [175]	93	99	OFF	OFF	Not Active	Not Neutral
EA0001E0	-15.0	Not Received	109 [175]	93	99	OFF	OFF	Not Active	Not Neutral
EA0001F0	-14.8	Not Received	110 [177]	93	99	OFF	OFF	Not Active	Not Neutral
EA000200	-14.6	Not Received	110 [177]	93	99	OFF	OFF	Not Active	Not Neutral
EA000210	-14.4	Not Received	110 [177]	93	99	OFF	OFF	Not Active	Not Neutral
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EA0002B0	-12.4	Not Received	112 [180]	93	99	OFF	OFF	Not Active	Not Neutral
EA0002C0	-12.2	Not Received	112 [180]	93	99	OFF	OFF	Not Active	Not Neutral
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EA000320	-11.0	Not Received	113 [182]	93	99	OFF	OFF	Not Active	Not Neutral
EA000330	-10.8	Not Received	114 [183]	93	99	OFF	OFF	Not Active	Not Neutral
EA000340	-10.6	Not Received	114 [183]	93	99	OFF	OFF	Not Active	Not Neutral
EA000350	-10.4	Not Received	114 [183]	93	99	OFF	OFF	Not Active	Not Neutral
EA000360	-10.2	Not Received	114 [183]	93	99	OFF	OFF	Not Active	Not Neutral
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EA000390	-9.6	Not Received	114 [183]	92.5	99	OFF	OFF	Not Active	Not Neutral
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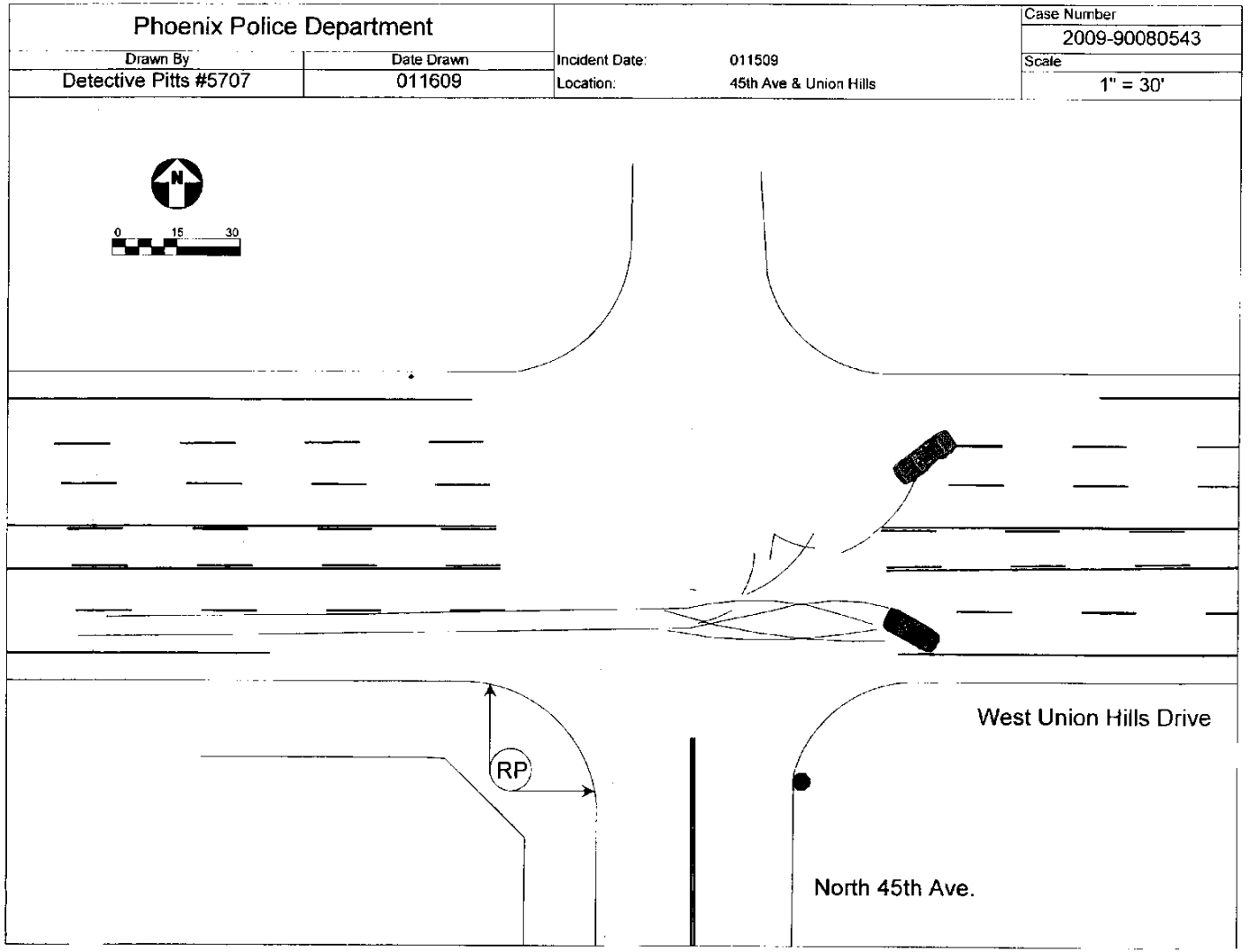
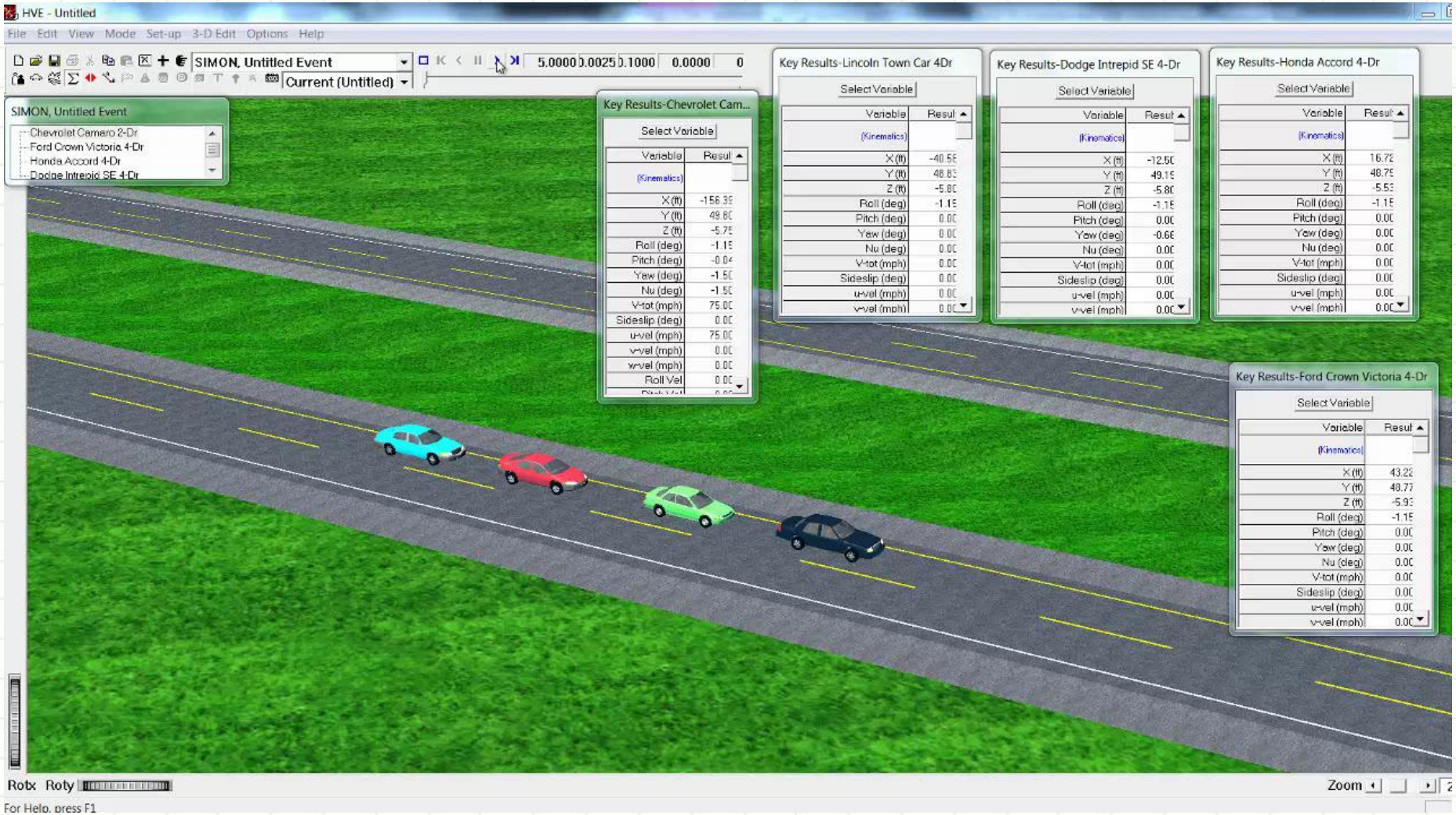
EA0003B0	-9.2	Not Received	115 [185]	86.5	99	OFF	OFF	Not Active	Not Neutral
EA0003C0	-9.0	Not Received	115 [185]	82	99	OFF	OFF	Not Active	Not Neutral
EA0003D0	-8.8	Not Received	115 [185]	79	99	OFF	OFF	Not Active	Not Neutral
EA0003E0	-8.6	Not Received	115 [185]	77	99	OFF	OFF	Not Active	Not Neutral
EA0003F0	-8.4	Not Received	115 [185]	75	99	OFF	OFF	Not Active	Not Neutral
EA000400	-8.2	Not Received	115 [185]	74.5	99	OFF	OFF	Not Active	Not Neutral
EA000410	-8.0	Not Received	115 [185]	74	99	OFF	OFF	Not Active	Not Neutral
EA000420	-7.8	Not Received	116 [187]	72	99	OFF	OFF	Not Active	Not Neutral
EA000430	-7.6	Not Received	116 [187]	71	99	OFF	OFF	Not Active	Not Neutral
EA000440	-7.4	Not Received	116 [187]	69	97	OFF	OFF	Not Active	Not Neutral
EA000450	-7.2	Not Received	116 [187]	68	92.5	OFF	OFF	Not Active	Not Neutral
EA000460	-7.0	Not Received	116 [187]	68	94	OFF	OFF	Not Active	Not Neutral

Scene Diagrams



Collision Simulation HVE

Human Vehicle Environment



Why Use Technology in the Courtroom

- Professional
- Visual society
- CSI Effect
- Impact
- Efficiency
- The defense does not use it
- Manage juror expectations

Demonstrative Evidence

A trial court has wide discretion in determining whether to allow demonstrative evidence and will not be overturned absent an abuse of discretion.

Payne v. M. Greenberg Construction, 130 Ariz. 338, 636 P.2d 116 (App.1981). *Andrews v. Fry's Food Stores of Arizona*, 160 Ariz. 93, 96-97, 770 P.2d 397, 400-01 (Ct. App. 1989)

Demonstrative Evidence

The admission of evidence is within the sound discretion of the trial court and will not be disturbed absent an abuse of that discretion.

State v. Hallman, 137 Ariz. 31, 668 P.2d 874 (1983).

State v. Luzanilla, 176 Ariz. 397, 405, 861 P.2d 682, 690 (Ct. App. 1993) aff'd in part, vacated in part, 179 Ariz. 391, 880 P.2d 611 (1994).

Demonstrative Evidence

Demonstrative evidence is relevant if it illustrates or explains testimony and will be admitted if its probative value outweighs the danger of unfair prejudice.

State v. Chapple, 135 Ariz. 281, 660 P.2d 1208 (1983). *State v. Luzanilla*, 176 Ariz. 397, 405, 861 P.2d 682, 690 (Ct. App. 1993) aff'd in part, vacated in part, 179 Ariz. 391, 880 P.2d 611 (1994)

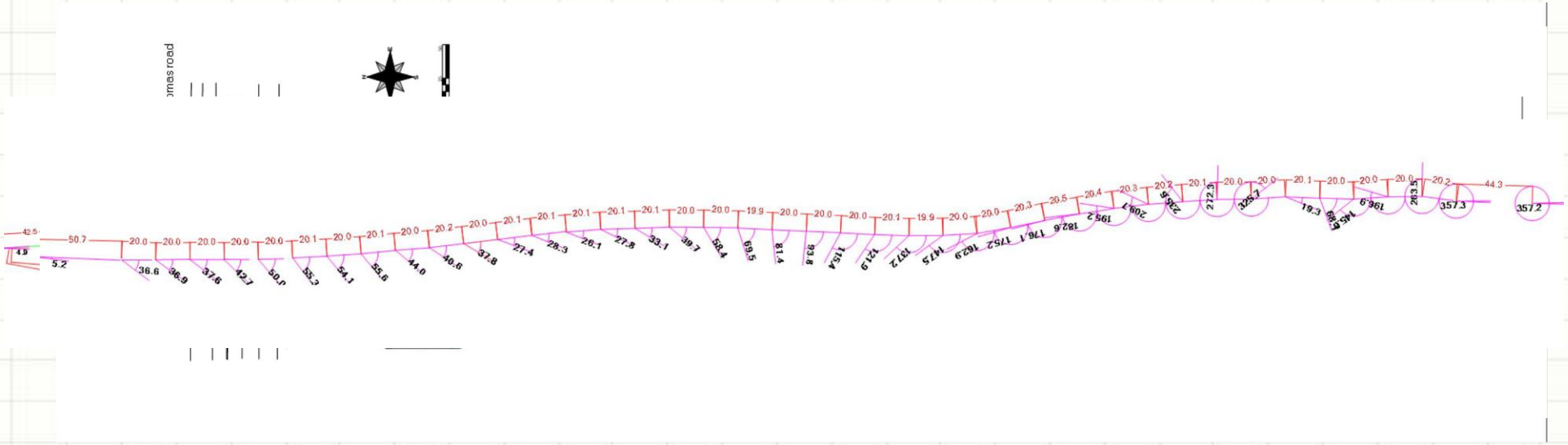

DAILY NEWS
WEEKLY MAGAZINE
FOLKS MAGAZINE
JURY BOX
Trial by error?

Spin Analysis and Momentum

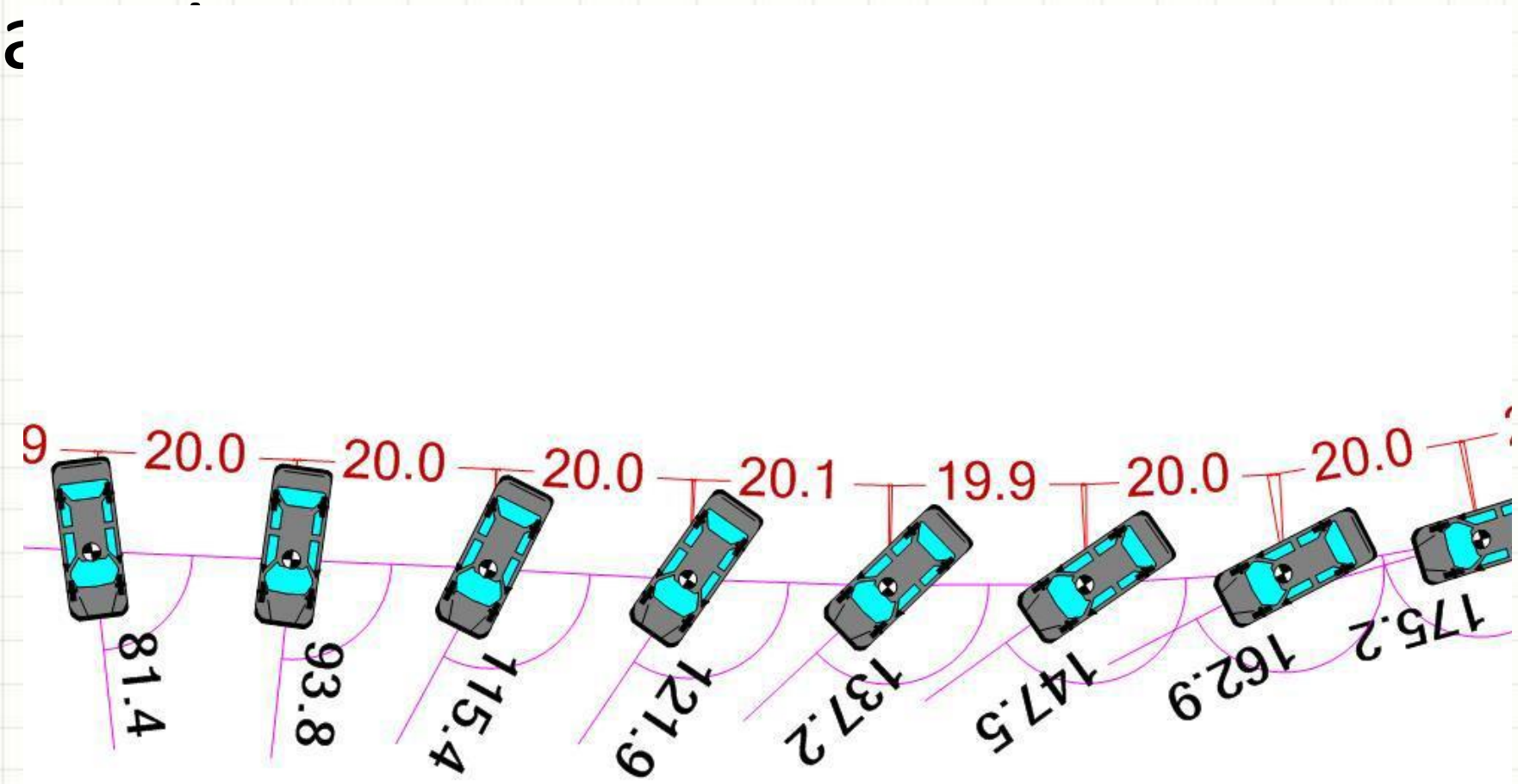

97
L6

Explanation

You did what?



Expla


9
20.0
20.0
20.0
20.1
19.9
20.0
20.0
81.4
93.8
115.4
121.9
137.2
147.5
162.9
175.2

Explanation

08-32729 Maxima Post-Impact Speed Analysis with speed at each interval

Spin Analysis											
Interval	Distance	Angle	α_{avg}	μ	f_r	μ-f_r	sin α_{avg}	m	f_{adj}	S mph	AS
1	20	36.60									92.51
2	20	36.90	36.75	0.49	0.06	0.43	0.596	0	0.35	14.49	91.36
3	20	37.60	37.25	0.49	0.06	0.43	0.605	0	0.35	14.49	90.21
4	20	42.70	40.15	0.49	0.06	0.43	0.645	0	0.37	14.90	88.97
5	20	50.00	46.35	0.49	0.06	0.43	0.724	0	0.41	15.68	87.58
6	20.1	55.30	52.65	0.49	0.06	0.43	0.795	0	0.45	16.47	86.01
7	20	54.10	54.70	0.49	0.06	0.43	0.816	0	0.46	16.61	84.39
8	20.1	55.60	54.85	0.49	0.06	0.43	0.818	0	0.46	16.65	82.74
9	20	44.00	49.80	0.49	0.06	0.43	0.764	0	0.43	16.06	81.16
0	20.2	40.60	42.30	0.49	0.06	0.43	0.673	0	0.39	15.37	79.69
10	20	37.80	39.20	0.49	0.06	0.43	0.632	0	0.37	14.90	78.29
11	20.1	27.40	32.60	0.49	0.06	0.43	0.539	0	0.32	13.89	77.05
12	20.1	28.30	27.85	0.49	0.06	0.43	0.467	0	0.29	13.22	75.90
13	20.1	26.10	27.20	0.49	0.06	0.43	0.457	0	0.28	12.99	74.78
14	20.1	27.80	26.95	0.49	0.06	0.43	0.453	0	0.28	12.99	73.65
15	20	33.10	30.45	0.49	0.06	0.43	0.507	0	0.31	13.64	72.37
16	20	39.70	36.40	0.49	0.06	0.43	0.593	0	0.35	14.49	70.91
17	19.9	58.40	49.05	0.49	0.06	0.43	0.755	0	0.43	16.02	69.07
18	20	69.50	63.95	0.49	0.06	0.43	0.898	0	0.5	17.32	66.87
19	20	81.40	75.45	0.49	0.06	0.43	0.968	0	0.53	17.83	64.45
20	20	93.80	87.60	0.49	0.06	0.43	0.999	0	0.54	18.00	61.88
21	20.1	115.40	104.60	0.49	0.06	0.43	0.968	0	0.53	17.88	59.24
22	19.9	121.90	118.65	0.49	0.06	0.43	0.878	0	0.49	17.10	56.72
23	20	137.20	129.55	0.49	0.06	0.43	0.771	0	0.43	16.06	54.40
24	20	147.50	142.35	0.49	0.06	0.43	0.611	0	0.36	14.70	52.38
25	20.3	162.90	155.20	0.49	0.06	0.43	0.419	0	0.26	12.58	50.84
26	20.5	175.20	169.05	0.49	0.06	0.43	0.190	0	0.15	9.60	49.93
27	20.4	176.10	175.65	0.49	0.06	0.43	0.076	0	0.1	7.82	49.31
28	20.3	182.60	179.35	0.49	0.06	0.43	0.011	0	0.07	6.53	48.88
29	20.2	195.20	188.90	0.49	0.06	0.43	-0.155	0	0.14	9.21	48.00
30	20.1	209.70	202.45	0.49	0.06	0.43	-0.382	0	0.25	12.28	46.40
31	20	235.60	222.65	0.49	0.06	0.43	-0.678	0	0.39	15.30	43.81
32	20	272.30	253.95	0.49	0.06	0.43	-0.961	0	0.53	17.83	40.02
33	20	325.70	299.00	0.49	0.06	0.43	-0.875	0	0.48	16.97	36.24
34	20	19.30	352.50	0.49	0.06	0.43	-0.131	0	0.12	8.49	35.23
35	20.1	68.10	43.70	0.49	0.06	0.43	0.691	0	0.4	15.53	31.63
36	20	145.00	106.55	0.49	0.06	0.43	0.959	0	0.53	17.83	26.12
37	20	196.90	170.95	0.49	0.06	0.43	0.157	0	0.14	9.17	24.46
38	20	263.50	230.20	0.49	0.06	0.43	-0.768	0	0.43	16.06	18.45
39	20.2	357.30	310.40	0.49	0.06	0.43	-0.762	0	0.43	16.14	8.93
Tot Dist	782.8							AVG f =	0.36		
			Drag Factor Efficiency		74.21%						
							Total Speed From Spin Analysis			92.07	
Road μ	69.80%										
Brake Eff	69.50%						Speed From Basic Formula			91.95	
Table μ	48.51%										

Interval	Distance	f	Speed MPH	Braking Efficiency
1	42.5	0.14	13.17	19.50%
2	141.1	0.35	38.44	50.00%
3	50.7	0.14	14.39	19.50%
4	Spin	Analysis	92.07	
5	44.3	0.06	8.93	Rollout, no brakes, metal to metal scratching
	Total Speed		102.06	

Actual Speed (AS)	
102.06	19% Braking Efficiency -- Impact Speed
101.20	50% Braking Efficiency
93.62	19% Braking Efficiency
92.51	Start of Spin
8.93	After Spin
0.00	Final Rest

Prepared by KSTROHMEYER 4/3/2014

Momentum

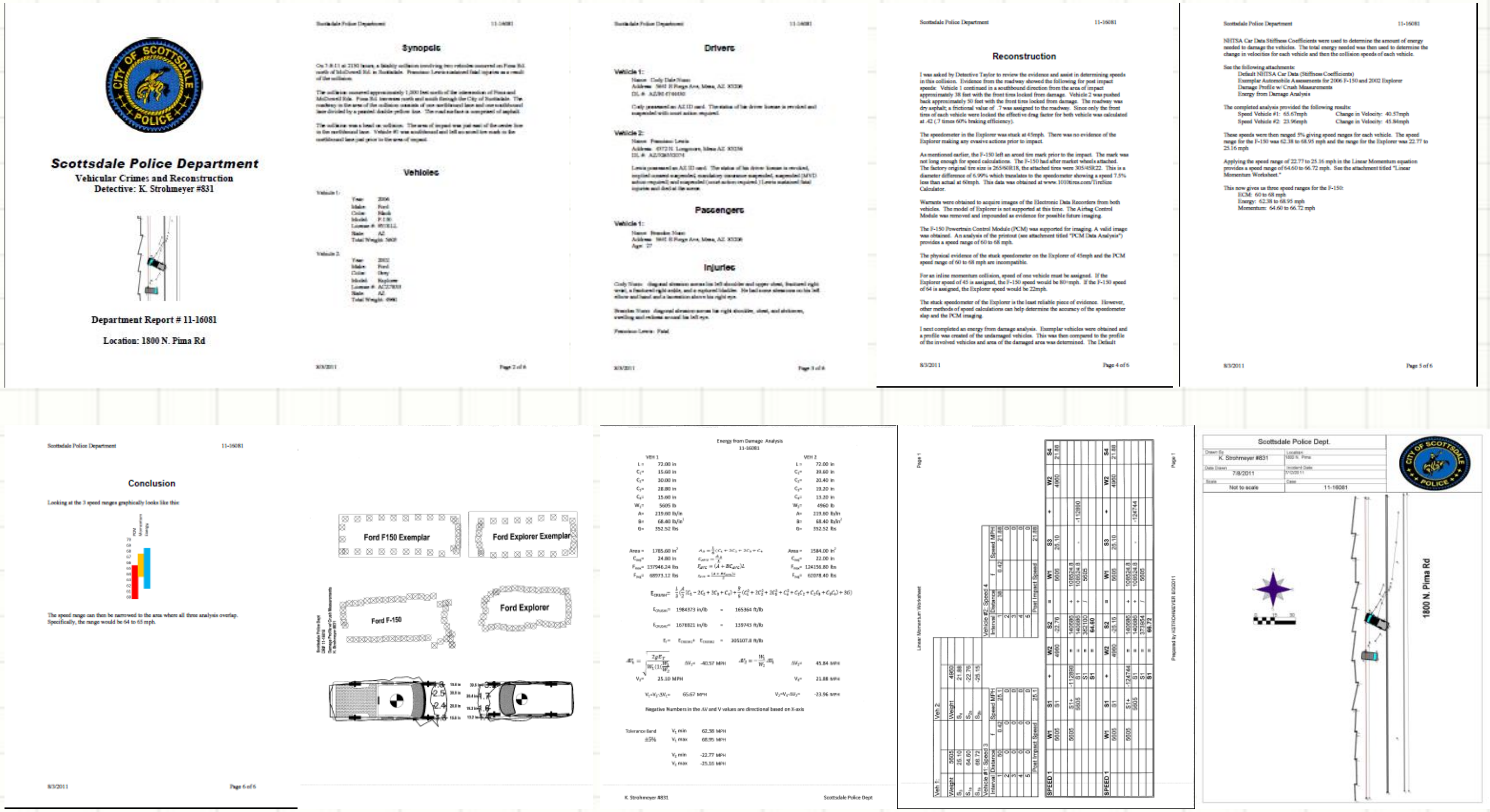
Veh 1: 2004 Nissan Maxima				Veh 2: '04 Suzuki GSX-R		
Weight	3919			Weight	539.9	
S_3	102.12			S_4	71.47	
S_{1a}	111.97			S_{2a}	0	
S_{1b}	107.38			S_{2b}	33.31	

S_{2b} =	f=.698	=	33.31
	D=53		

Suzuki Post Impact Speed				
Interval	Distance	f	Speed MPH	
1	160.3	0.35	41.03	71.47
2	33.7	0.9	30.16	58.52
3	28.3	0.35	17.24	50.15
4	57.6	1	41.57	47.09
5	46.6	0.35	22.12	22.12
	Post Impact Speed		71.47	

SPEED 1		**W1**	**S1**	**+**	**W2**	**S2**	**=**	**W1**	**S3**	**+**	**W2**	**S4**
		3919	S1		539.9	0		3919	102.12		539.9	71.47
		3919	S1+	0	=	400210	+	38587				
			3919	S1	=	400210	+	38587	-	0		
				S1	=	438797	/	3919				
				S1	**=**	**111.97**						
SPEED 1		**W1**	**S1**	**+**	**W2**	**S2**	**=**	**W1**	**S3**	**+**	**W2**	**S4**
		3919	S1		539.9	33.31		3919	102.12		539.9	71.47
		3919	S1+	17984	=	400210	+	38587				
			3919	S1	=	400210	+	38587	-	17984.1		
				S1	=	420813	/	3919				
				S1	**=**	**107.38**						

Head-On Collision


Scottsdale Police Department
Vehicular Crimes and Reconstruction
Detective: K. Strohmeyer #831
Department Report # 11-16081
Location: 1800 N. Pima Rd
Synopsis
Vehicles
Drivers
Passengers
Injuries
Reconstruction
Conclusion
Ford F150 Exemplar
Ford Explorer Exemplar
Ford F-150
Ford Explorer
Scottsdale Police Dept.
1800 N. Pima Rd

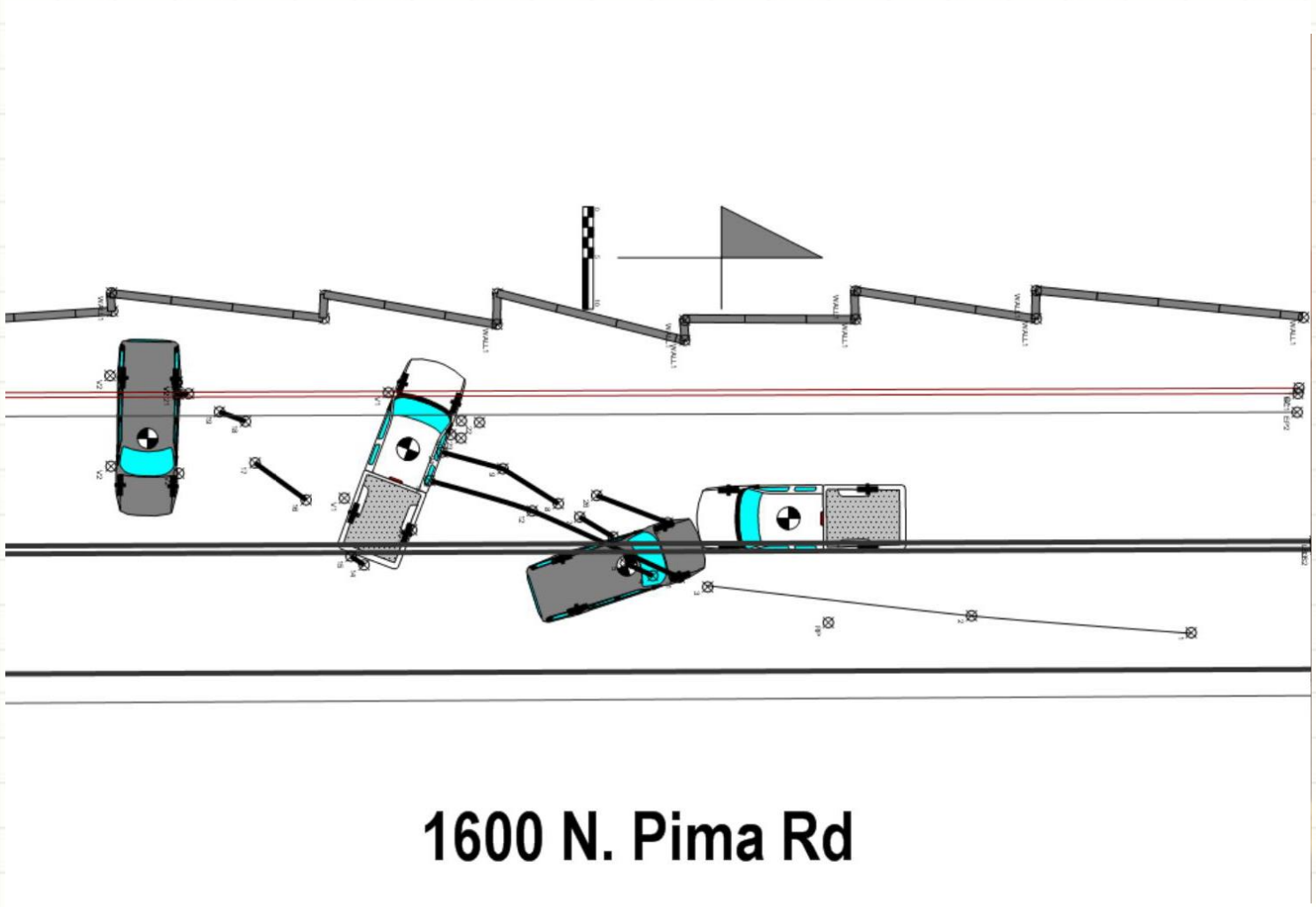
In my expert opinion, the officer does not know what he is talking about.

CONCLUSIONS

It is my opinion, based on a thorough review of the file, careful examination and inspection of both vehicles, extensive research into crash test data and vehicle specifications, specific crush modeling and engineering analysis to determine impact angles and impact speeds, as well as my extensive experience investigating more than three thousand vehicle accidents, that the Nunn vehicle was traveling in the southbound travel lane and the Lewis vehicle was angled across the center line when the collision occurred. In addition, investigating police made critical calculation errors and omitted numerous evidence points in arriving at their incorrect conclusion that the Nunn vehicle caused the accident in this case.

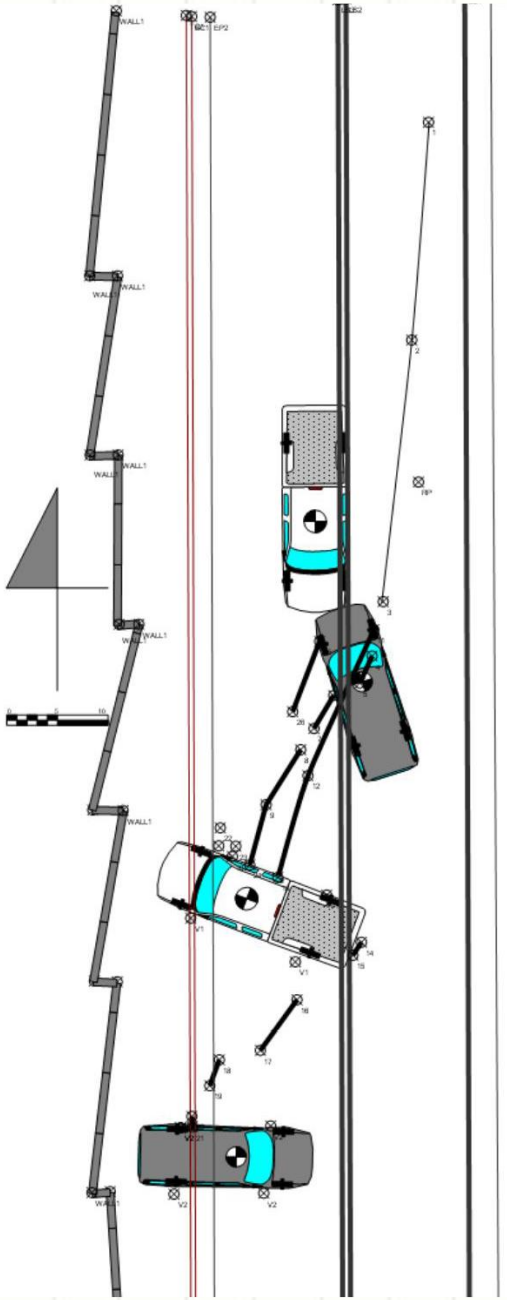
1. Methods for Speed determination were improperly applied
2. Vehicle were not placed in area of impact on diagram
3. Points deleted from log and not shown on diagram
4. Incorrect determination of vehicle placement

Methodology	Police	Expert
Momentum	64 to 66	60
Energy Conservation	62 to 68	59
CDR Analysis	60 to 68	60 to 68
Conclusion	64 to 65	59 to 60

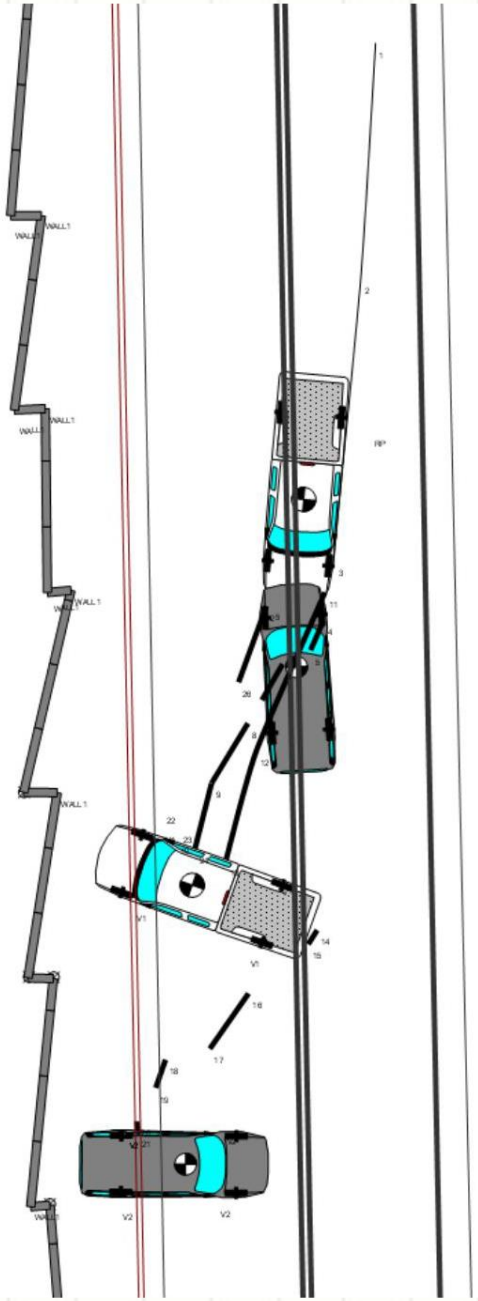


1600 N. Pima Rd

3 H



1600 N. Pima Rd

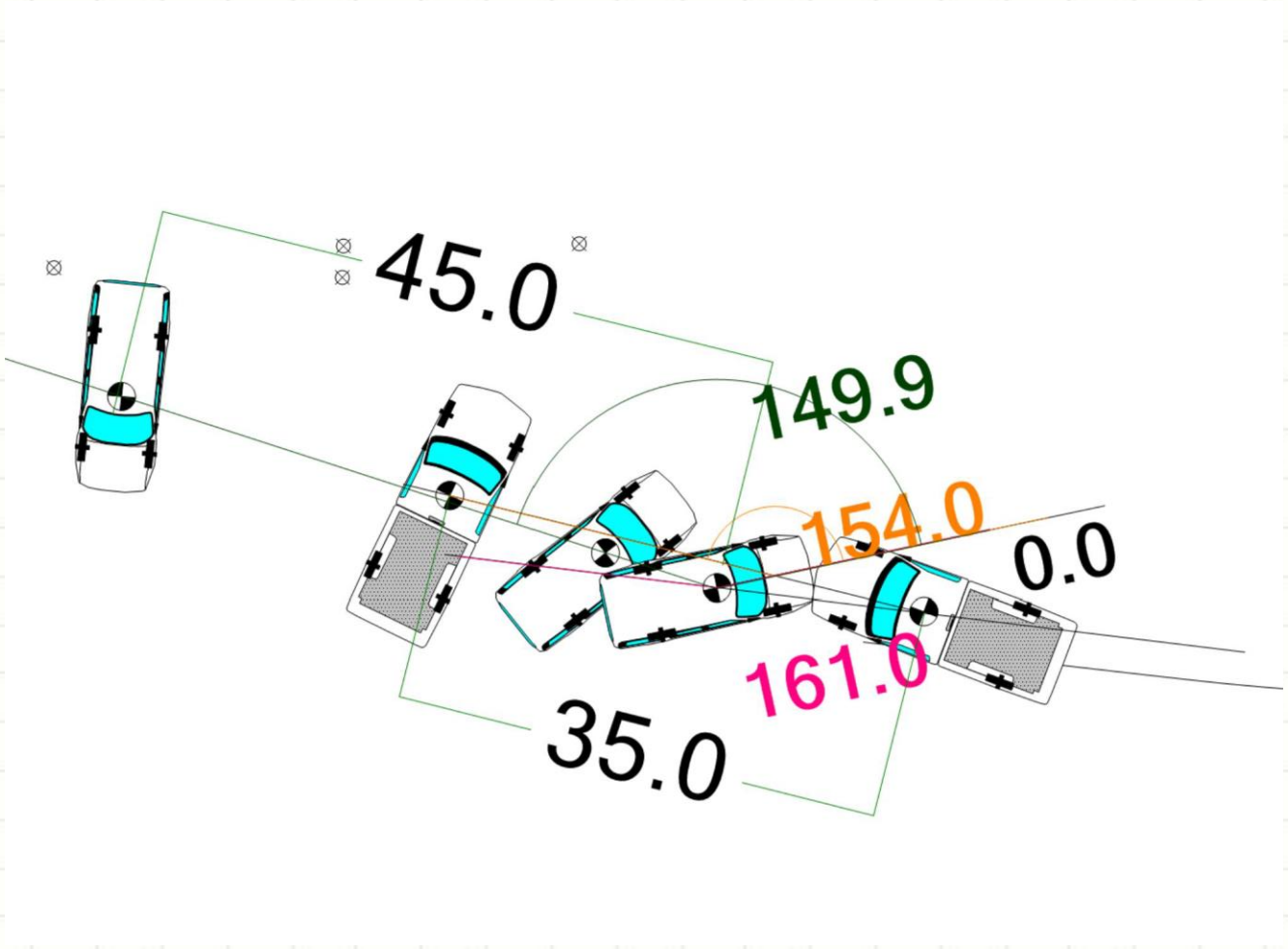


1600 N. Pima Rd

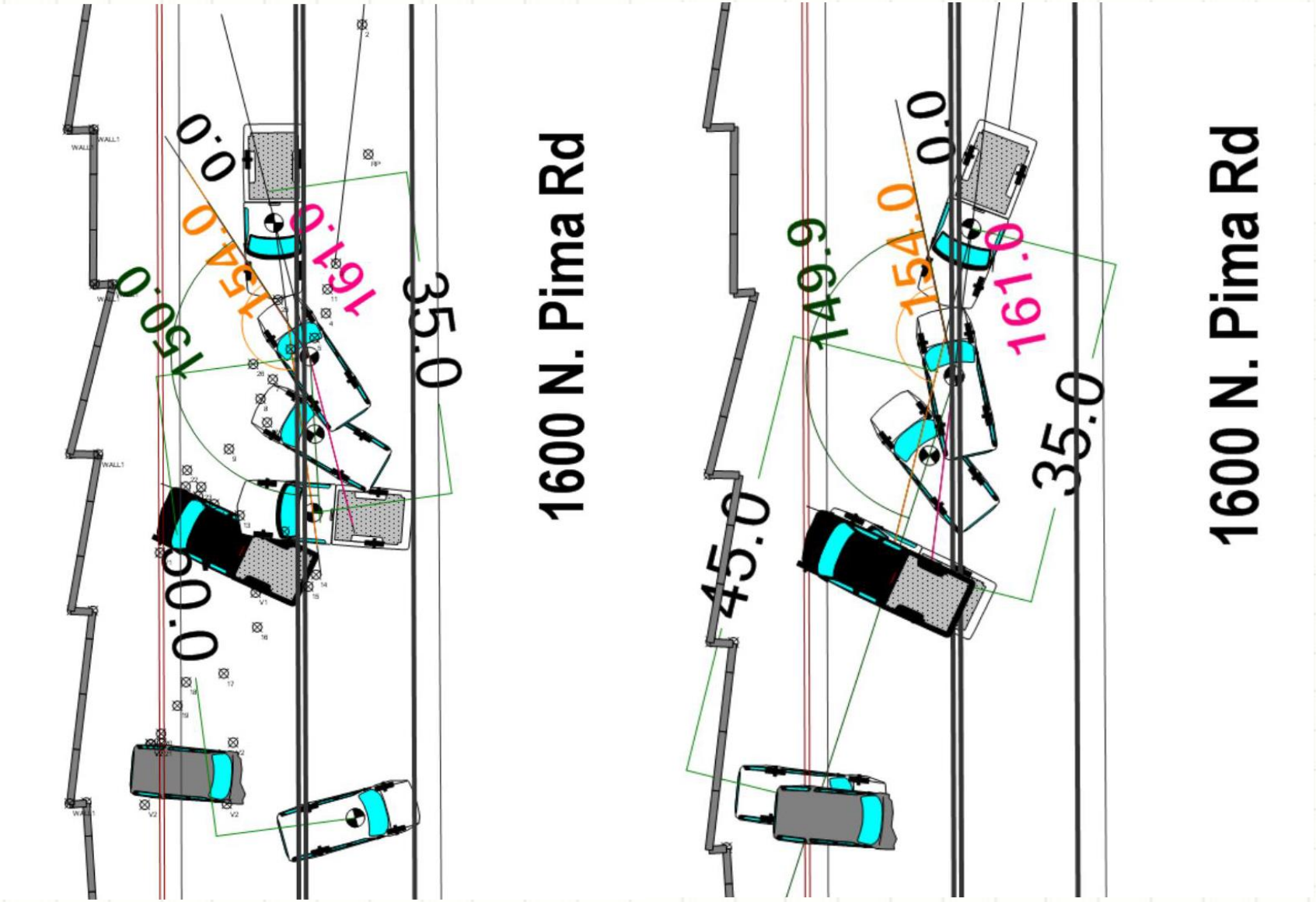
The Expert’s Report

- Get the entire report
- Go through the report and find the raw data
- Reconstruct the crash using their data
- Does the crash make sense?
- Does what they report match your results?

The Expert's Momentum



You Decide



Expert's Impact

Vehicle Uncontrolled Point of Rest

You Decide

STATE OF ARIZONA

v.

CHARLES BROWN

Unit #1 Pre-Impact


Bellair

Unit #1 Post-Impact

Unit #2 Pre-Impact


UNION HILLS
SPEED LIMIT
25

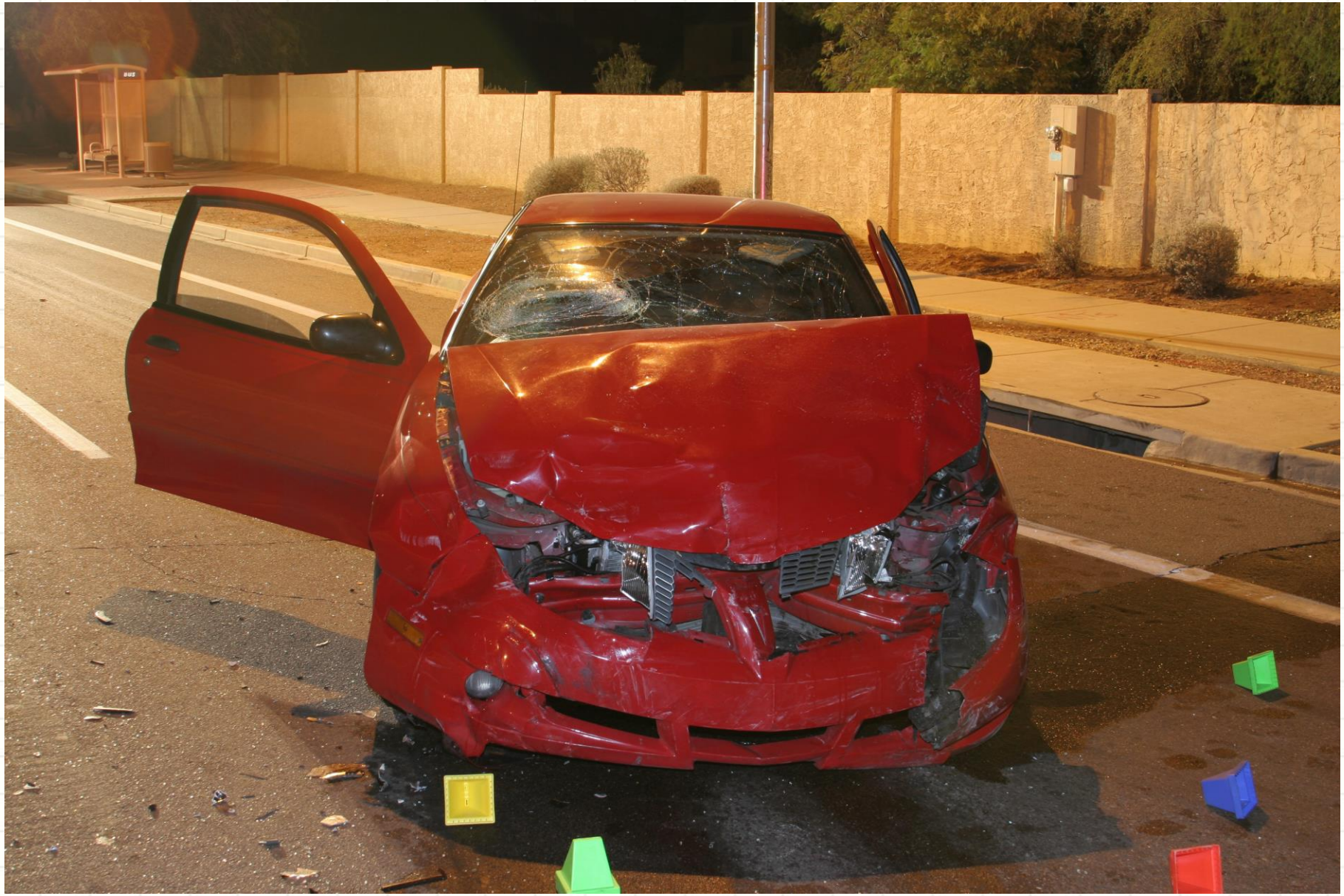
Unit #2 Post-Impact

Units at Points of Rest

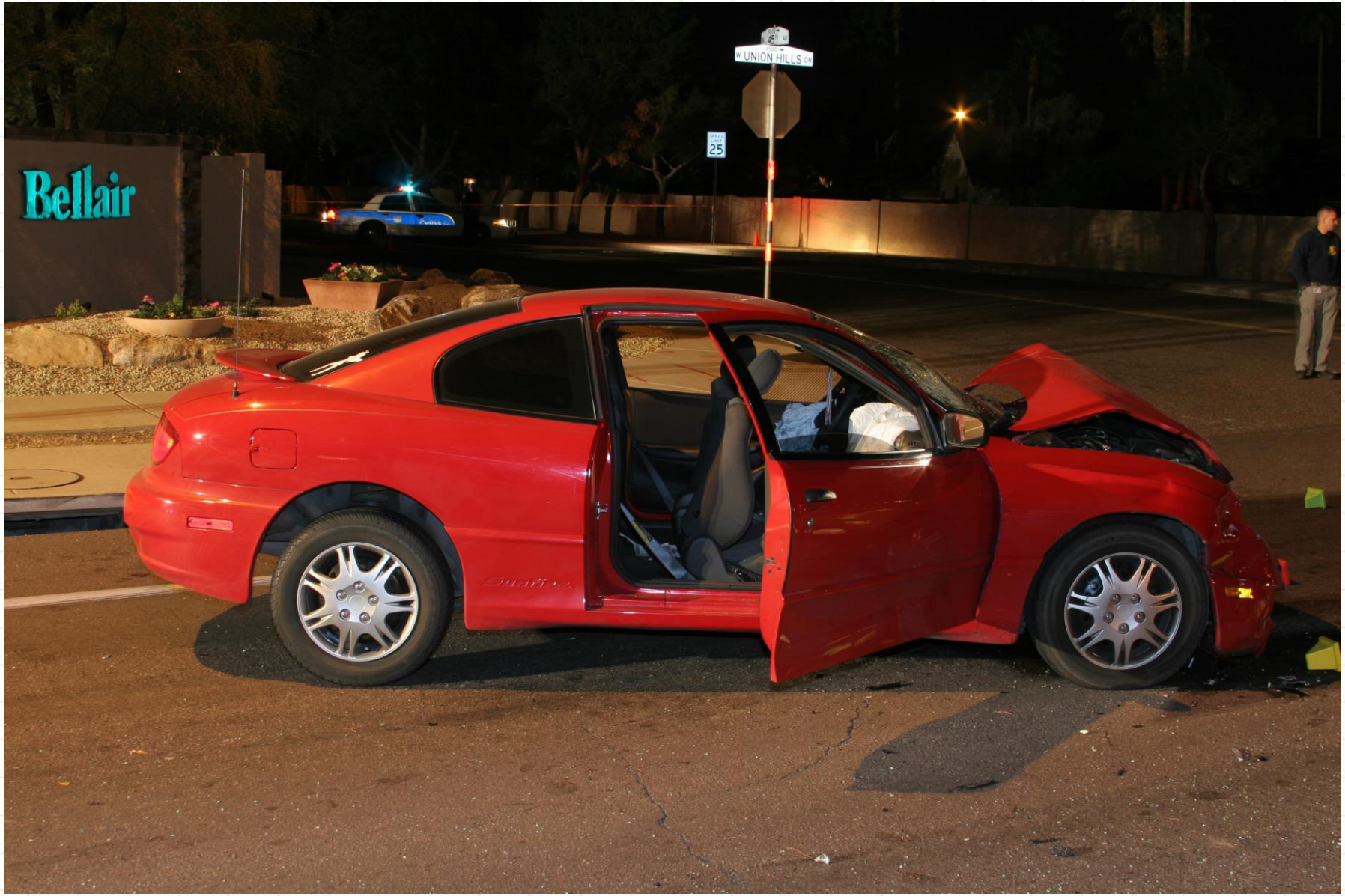

SPEED LIMIT
25

Unit #1


APR
ARIZONA
ADC1739




Bellair


Bellair
W UNION HILLS DR
45TH AV
SPEED LIMIT
25

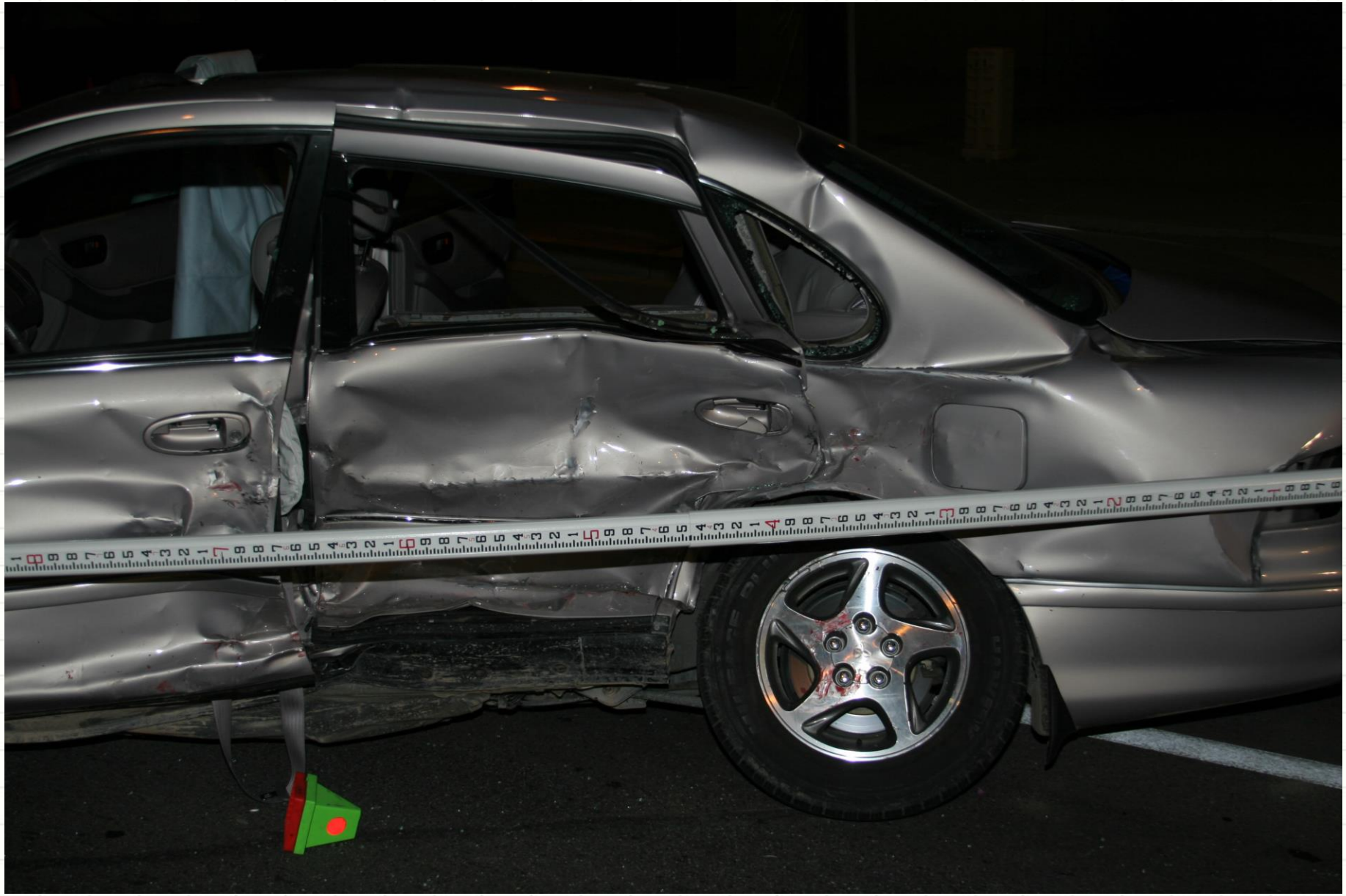

RIKEN


HR

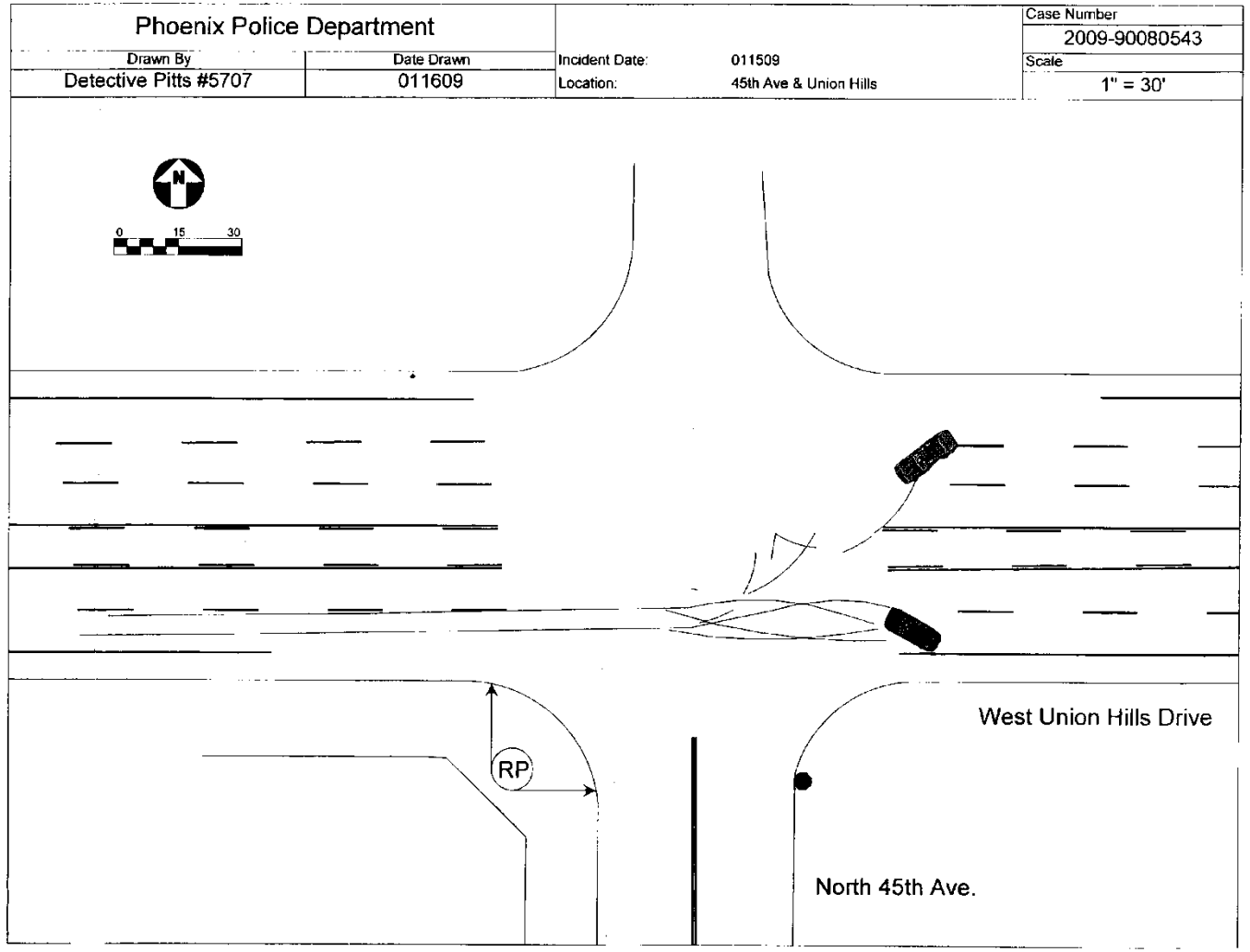
Unit #2


TOYOTA
AVALON XL5
NOV
09
597·EVX


SPEED
LIMIT
25



THE COLLISION RECONSTRUCTION



DETECTIVE PITTS' COLLISION RECONSTRUCTION

- Science
  - **Newton's Laws of Motion**

    1.Every body at rest tends to stay at rest, while every body in motion tends to remain in motion, unless it is acted upon by an unbalanced external force.

    2.The acceleration of any body is directly proportional to the force acting on this body while it is inversely proportional to the mass of the body.

    3.For every force exerted by a body on another body, there is an equal but opposite force reacting on the first body by the second.
- Physical evidence
- Conclusions
  - 85 to 86 mph

142.5 FEET OF SKID

Air Bag Module

DEPLOYMENT EVENT

SPEED	THROTTLE
89 mph	100%
91 mph	100%
92 mph	100%
61 mph	0%
6	0%

BRAKE SWITCH

OFF

OFF

OFF

ON

ON

BOSCH

CDR CRASH DATA RETRIEVAL SYSTEM

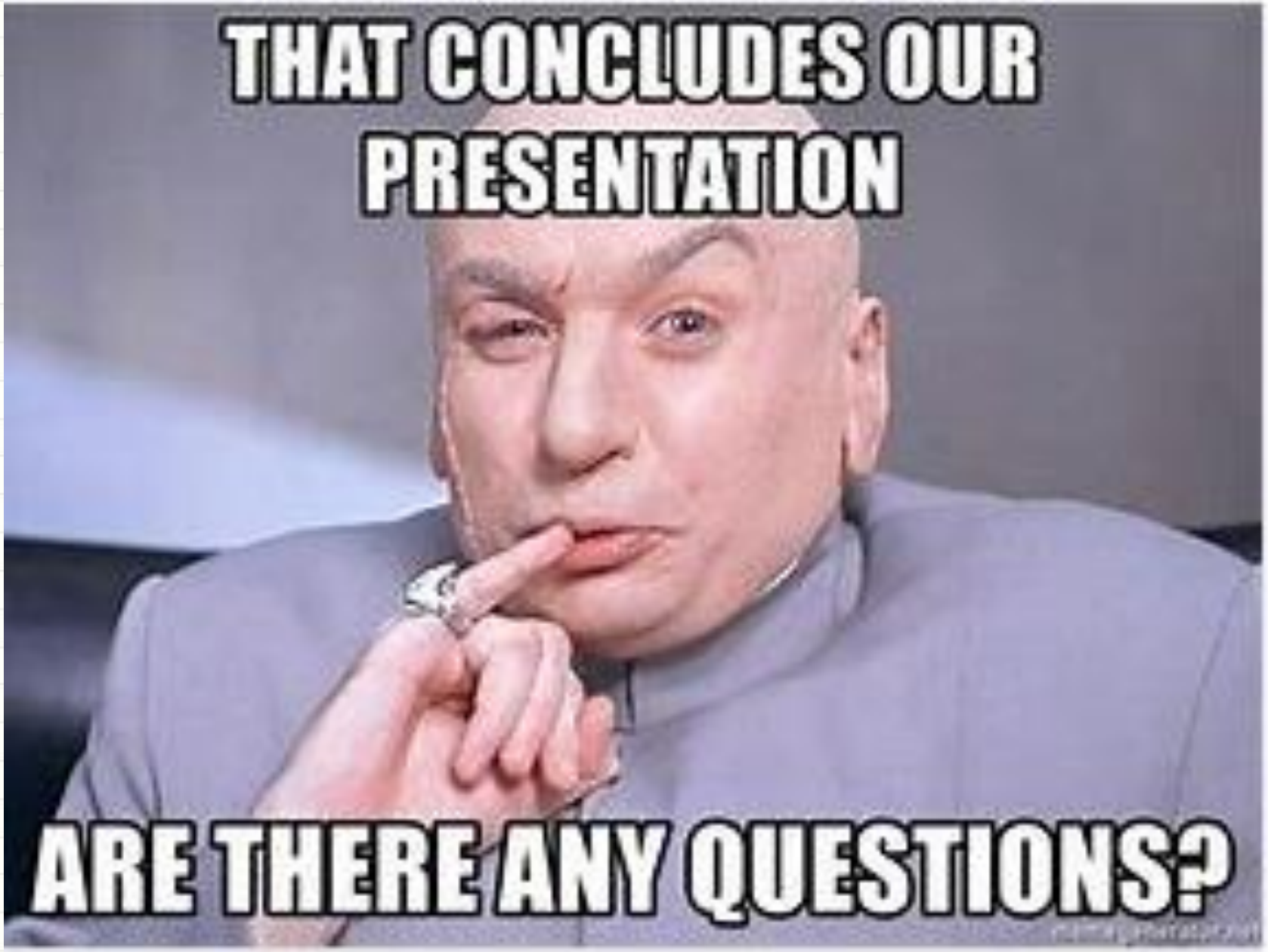
System Status At Deployment

SIR Warning Lamp Status	OFF
Driver's Belt Switch Circuit Status	UNBUCKLED
Passenger Front Air Bag Suppression Switch Circuit Status	Air Bag Not Suppressed
Ignition Cycles At Deployment	12786
Ignition Cycles At Investigation	12787
Maximum SDM Recorded Velocity Change (MPH)	-25.55
Algorithm Enable to Maximum SDM Recorded Velocity Change (msec)	85
Time Between Non-Deployment And Deployment Events (sec)	1.6
Time From Algorithm Enable to Deployment Command Criteria Met (msec)	7.5

Seconds Before AE	Vehicle Speed (MPH)	Engine Speed (RPM)	Percent Throttle
-5	89	5056	100
-4	91	5184	100
-3	92	5248	100
-2	61	3008	0
-1	6	896	0

Seconds Before AE	Brake Switch Circuit Status
-8	OFF
-7	OFF
-6	OFF
-5	OFF
-4	OFF
-3	OFF
-2	ON
-1	ON

With a sickening jolt, Mel realized the awful truth: he was being defended by a pair of court-appointed light-weights, against the sharpest prosecutors in the county.


THAT CONCLUDES OUR PRESENTATION
ARE THERE ANY QUESTIONS?